

Claims:

1. A method of performing calibration and quality control of a sensor for determining a parameter in a test fluid in which a calibration and quality control cycle is repeated, the cycle comprising the steps of:

performing at least one calibration of the sensor using a reference material representing a parameter level of the parameter;

performing at least one quality control of the sensor, as calibrated, using another reference material representing another parameter level of the parameter than in the calibration step; and

repeating the above steps for at least two cycles,

wherein in one cycle the reference material used in the quality control step was used in the calibration step of a another cycle.

2. The method according to claim 1, wherein two or more reference materials representing different parameter levels of the parameter are used in the calibration step.

3. The method according to claim 1, wherein the cycle is repeated until each of the reference materials have been used at least once for quality control of the sensor.

4. The method according to claim 1, wherein in the cycle the calibration performed in the calibration step is a first calibration and that the cycle further comprises the step of

performing a second calibration of the sensor using the same reference materials as were used in the first calibration step and in the quality control step.

5. The method according to claim 4, wherein in the cycle

sensor responses are obtained to the reference materials used in the first calibration step and the quality control step;

a further sensor response is obtained to the reference material used in the quality control step; and

the second calibration is based on the sensor responses obtained in the first calibration step and on the further sensor response obtained.

6. The method according to claim 4, wherein in the cycle

sensor responses are obtained to the reference materials used in the first calibration step and the quality control step; and

the second calibration is based on the sensor responses obtained in the first calibration step and the quality control step.

7. The method according to claim 2, wherein in the cycle

the parameter levels of the reference materials used for performing the calibration upon which the quality control is based define a calibration range;

the parameter levels of all the reference materials used in said cycle define a total range; and

said calibration range is at least one fourth of said total range.

8. The method according to claim 2, wherein in the cycle

the parameter levels of the reference materials used for performing the calibration upon which the quality control is based define a calibration range;

the parameter levels of all the reference materials used in said cycle define a total range; and

said calibration range is at least one third of said total range.

9. The method according to claim 1, wherein the parameter is a blood parameter.

10. The method according to claim 1, wherein the reference materials are fluids held in sealed containers.

11. A method of performing calibration and quality control of a sensor for determining a parameter in a test fluid comprising the steps of:

performing a first calibration of the sensor using a reference material representing a parameter level of the parameter;

performing a quality control of the sensor, as calibrated, using another reference material representing another parameter level of the parameter than in the calibration step; and

performing a second calibration of the sensor using the same reference materials as were used in the steps of performing the first calibration and the quality control.

12. The method according to claim 11, wherein two or more reference materials representing different parameter levels of the parameter are used in the calibration step.

13. The method according to claim 11, wherein

sensor responses are obtained to the reference materials used in the first calibration step and the quality control step;

a further sensor response is obtained to the reference material used in the quality control step; and

the second calibration is based on the sensor responses obtained in the first calibration step and on the further sensor response obtained.

14. The method according to claim 11, wherein

sensor responses are obtained to the reference materials used in the first calibration step and the quality control step; and

the second calibration is based on the sensor responses obtained in the first calibration step and the quality control step.

15. The method according to claim 12, wherein

the parameter levels of the reference materials used for performing the calibration upon which the quality control is based define a calibration range;

the parameter levels of all the reference materials used define a total range; and

said calibration range is at least one fourth of said total range.

16. The method according to claim 11, wherein the parameter is a blood parameter.

17. The method according to claim 11, wherein the reference materials are fluids held in sealed containers.

18. An apparatus for determining a parameter in a test fluid comprising

a sensor sensitive to the parameter in the test fluid and providing a sensor response;

reference materials representing at least two different parameter levels of the parameter; and

a programmable device for controlling the functioning of the apparatus,

wherein the programmable device controls the execution of a method of performing calibration and quality control of the sensor in which a calibration and quality control cycle is repeated, the cycle comprising the steps of

performing at least one calibration of the sensor using a reference material representing a parameter level of the parameter;

performing at least one quality control of the sensor, as calibrated, using another reference material representing another parameter level of the parameter than in the calibration step; and

repeating the above steps for at least two cycles,

wherein in one cycle the reference material used in the quality control step was used in the calibration step of a previous cycle.

19. The apparatus according to claim 18 further comprising

means for exposing the sensor to a portion of the test fluid;

means for exposing the sensor to the reference materials for the parameter and obtaining a response; and

means for reporting a measured parameter value, and wherein the programmable device comprises means for determining the measured parameter value.

20. The apparatus according to claim 18, wherein the apparatus comprises reference materials representing at least three different parameter levels of the parameter.

21. The apparatus according to claim 18, wherein at least two reference materials are located in one cartridge.

22. The apparatus according to claim 18, wherein the sensor is a miniaturized planar sensor.

23. The apparatus according to claim 18, wherein the sensor is located in a measuring chamber forming an integral part of the apparatus.

24. The apparatus according to claim 18, wherein the sensor is located in a removable cassette.

25. The apparatus according to claim 18, wherein the apparatus is a blood analyzer.

26. A method of performing calibration and quality control of a sensor for determining a parameter in a test fluid comprising:

performing multiple calibration and quality control cycles comprising:

(a) performing a calibration of the sensor; and

(b) performing a quality control of the sensor as calibrated,

wherein in at least one of the calibration and quality control cycles, the step (a) of performing a calibration includes obtaining a sensor response corresponding to a first reference material which represents a first parameter level of the parameter, and the step (b) of performing a quality control includes obtaining a sensor response corresponding to a second reference material which represents a second parameter level of the parameter, wherein the first parameter level and the second parameter level differ, and

wherein in at least another of the calibration and quality control cycles, the step (b) of performing a quality control includes obtaining a sensor response corresponding to the first reference material.

27. The method according to claim 26, wherein in the at least one calibration and quality control cycle, the step (a) further includes obtaining a sensor response corresponding to a third reference material, wherein said first reference material and said third reference material represent different parameter levels of the parameter.

28. The method according to claim 26, wherein in the at least one calibration and quality control cycle, the step (a) further includes obtaining multiple sensor responses corresponding to multiple reference materials, wherein said first reference material and said multiple reference materials represent different parameter levels of the parameter.

29. The method according to claim 26, wherein in the multiple calibration and quality control cycles, each of the reference materials is used at least once in the steps (b) of performing a quality control of the sensor as calibrated.

30. The method according to claim 26, wherein in the at least another calibration and quality control cycle, the step (a) includes obtaining a sensor response corresponding to one or more reference materials, wherein said one or more reference materials and said first reference material each represent different parameter levels of the parameter.

31. The method according to claim 26, wherein the at least one calibration and quality control cycle further comprises:

(c) performing a second calibration of the sensor using at least one of the sensor responses corresponding to the first reference material and the second reference material.

32. The method according to claim 26, wherein the at least one calibration and quality control cycle further comprises:

(c) performing a second calibration of the sensor including obtaining a second sensor response corresponding to the second reference material and using at least the sensor response corresponding to the first reference material and the second sensor response corresponding to the second reference material to determine a calibration relationship of the sensor.

33. The method according to claim 27, wherein in the at least one calibration and quality control cycle:

the step (a) comprises obtaining sensor responses corresponding to two or more reference materials, the reference materials representing different parameter levels of the parameter and the parameter levels defining a calibration range;

the parameter levels of all the reference materials used in said cycle define a total range; and

said calibration range is at least one fourth of said total range.

34. The method according to claim 27, wherein in the at least one calibration and quality control cycle:

the step (a) comprises obtaining sensor responses corresponding to two or more reference materials, the reference materials representing different parameter levels of the parameter and the parameter levels defining a calibration range;

the parameter levels of all the reference materials used in said cycle define a total range; and

said calibration range is at least one third of said total range.

35. The method according to claim 1, wherein the parameter is a blood parameter.